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EXPERIMENTAL EVALUATION OF THE FLIGHT LINE FOOD SERVICE FACILITY AT TRAVIS AIR FORCE BASE

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TECHNICAL REPORT

75-4-OR/SA

EXPERIMENTAL EVALUATION OF THE FLIGHT LINE FOOD SERVICE FACILITY AT TRAVIS AFB

by

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JUNE 1974

Operations Research and
Systems Analysis Office

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ABSTRACT

A brief description and preliminary results from the evaluation of a new food service concept for satellite feeding requirements in the Air Force are discussed, including facility design and equipment support requirements, menu, food preparation, supply, operations, personnel and performance. It is concluded that this concept provides a highly acceptable and effective alternative method of feeding personnel in the maintenance area where, because of work requirements, they are unable to utilize established dining facilities. It is recommended that the concept be adopted for application at those bases when justified by mission, military strength, and food service operations policies.

INTRODUCTION

During FY 1973–1974 the Operations Research and Systems Analysis Office conducted an investigation of Air Force food service operations under Task 03, Project No. 1J662713AJ45, Analysis and Design of Military Feeding Systems, of the DOD Food Research, Development, Testing and Engineering Program. This effort was directed primarily towards defining, developing and evaluating alternative methods for improving the existing food service system, particularly customer participation and satisfaction, and in identifying possible cost reductions. One result of this project was the development and evaluation of a new military food service concept, involving centrally prepared meals, for application to satellite feeding requirements in the Air Force.

As conceived for Travis Air Force Base, where the concept was implemented and evaluated during a food service system experiment between 1 November 73 and 31 January 74, it provides an alternative method of feeding maintenance area personnel who, because of mission requirements, cannot attend scheduled meals in the dining halls. Typically, these airmen are delivered a box meal prepared in the Inflight Kitchen to be eaten at the job site. The box meal is wholesome, and nutritious and generally quite adequate, except when continually substituted for regular meals. The proposed system offered a variety of high quality, hot meals in a small food service facility located immediately in the maintenance area. This report contains a description of the operation and performance of the facility during the experiment.

It should also be noted, at this point, that Travis AFB is continuing to operate the flight line food service facility, as the concept has been designated in this instance, pending final Air Force decisions on the recommendation that this system be adopted and expanded to other installations where similar requirements exist.

OBJECTIVES

The flight line facility was designed and operated to meet the following objectives, derived from earlier consumer research and system studies:

1. Conveniently locate a food outlet in the work area for both RIK (rations-in-kind) and BAS (basic allowance for subsistence) customers.

2. Offer a variety of high quality, hot meals, soups and sandwiches and other items in addition to the foods usually available in the box meals used for ground feeding.

3. Provide prepared meals and other food items in individually portioned and packaged form to be consumed in the facility or taken to the work site.

4. Minimize the total labor required to operate and support the facility.

5. Serve a total of approximately 200 meals per day.

To be most effective in this type of feeding situation, it was determined that a food service facility should be convaniently located in proximity to the maintenance area, should offer a more extensive menu for greater variety and must serve hot foods to achieve higher quality meals, all of which are highly important factors to the consumer. Further, the location of a facility near to work, high-speed service, and the opportunity for take-out service would reduce time away from the job (as compared to attending the only available dining hall). Only a modest investment is required in space and equipment, with no increase in food costs or labor requirements when compared to conventional dining hall operations. Additionally, it was expected that some savings may be achieved by shifting the load from the Inflight Kitchen and the dining hall which were previously servicing some of the customers electing to use this facility.

SYSTEM CONCEPT

Several alternatives were initially considered to meet the above objectives, including the following broad concepts:

1. A mobile food service (i.e., a truck designed and fitted out with a steam table, refrigeration and all other necessary equipment) to deliver and serve hot food prepared at a central location to the individual work sites.

2. A portable food service line for serving centrally prepared hot meals and other foods, which could be transported to a fixed site food outlet in or near the work areas.

3. An additional food service activity established in the maintenance area, at which hot meals and foods could be prepared and served.

4. Central preparation, packaging and preservation of meals and other food items, to be delivered to an on-site food service facility for reheating, as may be required, and serving to the customers.

After careful examination and evaluation of all aspects of implementation and operation of each concept, it was determined that the latter option – satelliting a new food outlet in the maintenance area on an existing kitchen operation – was the most practical and economic alternative. Under this concept, there would be no need to incur the high cost of constructing and equipping a new kitchen operation, and additional utilities (steam, gas, sanitary drains, and large volume water and electrical services) associated with food preparation could be avoided. Eliminating these requirements allows the location of the food outlet to be dictated by convenience to the work site. The use of chilled

or frozen meals and sandwiches not only provides for higher consumer quality, but avoids the logistical problems related to the handling and delivery of hot foods, and prevents the loss of nutrition normally sustained from holding hot foods over relatively long periods of time before being consumed.

The Inflight Kitchen was utilized as the central preparation facility. Meals and sandwiches were prepared in bulk, using standard equipment, portioned and packaged in disposable plastic containers, and either frozen or chilled, as appropriate to the type of food and the planned period of usage. These items were stored at the Inflight Kitchen and transported, as required, in insulated containers, to the food outlet located in a hangar on the flight line . Foods to be offered hot were heated in a microwave oven and served from a heated display case. Sandwiches, beverages and other items requiring refrigeration were served from a cold display case. Carbonated beverages and ice cream were available from a third unit. After completing headcount (RIK customers received meals at no cost and BAS customers paid normal meal prices), the customers served themselves from the cabinets. They could then eat in a small dining room included in this facility or take the food out to eat elsewhere.

MENU

The menu was designed to provide high preference foods and to be compatible with proposed food preparation and handling methods and available equipment, as well as to provide for sufficient variety and nutritional adequacy. A copy is inclosed as Tables 1 and 2. A principal requirement for a food item to be included on the menu was that it be possible to achieve and maintain acceptable levels of quality throughout the process of preparation, packaging, freezing or chilling, storage, microwave heating and/or holding for reasonable periods in the display units. The food service equipment and available storage limited the number of different foods on the menu. A mix of two entrees, four hot sandwiches and two cold sandwiches comprised the main items. Some items were added to improve nutritional balance, e.g., bread and rolls with butter, hard-boiled eggs, cottage cheese, and fruit juices, although these were not necessarily among the highest preference food items. Appropriate desserts were then selected to complete the meals. A one week menu cycle was established by changing both entrees and repeating a different combination of entrees on weekends. A longer cycle was rejected since it would have to involve less desirable foods, and may have tended to create a TV-dinner syndrome by requiring the inclusion of casseroles to achieve the desired effect of variety.

INFLIGHT KITCHEN OPERATIONS

All foods requiring preparation were cooked, packaged, and frozen or chilled at the Inflight Kitchen. This facility was selected for food preparation because it was best suited to this purpose by design and technique, i.e., the personnel working there were more

TABLE 1

DINNER MENU

SOUPS

DAILY	Chili Con Carne, Chicken Noodle Soup, Vegetable Soup, Cream of Tomato Soup
MON –	Vegetable–Beef Soup
TUE –	Cream of Chicken Soup
WED –	Minestrone Soup
THU –	Beef Noodle Soup
FRI –	Clam Chowder
SAT –	Chicken Rice Soup
SUN –	Cream of Mushroom Soup

SALADS

MON –	Cole Slaw	and	Canned Fruit
TUE –	Lettuce & Cucumber	and	Jellied Fruit
WED –	Cole Slaw	and	Canned Fruit
THU –	Lettuce & Onion	and	Cottage Cheese & Fruit or Jello
FRI –	Cole Slaw	and	Canned Fruit
SAT –	Lettuce & Radishes	and	Cottage Cheese & Fruit or Jello
SUN –	Lettuce & Tomato	and	Canned Fruit

ENTREES

MON –	Salisbury Steak/Hashed Browns/Corn and Roast Turkey/Mashed Potatoes/Mixed Vegetables
TUE –	Baked Ham/Home Fries/Peas & Carrots and Fried Chicken/Potato Puffs/Mexican Corn
WED –	Roast Pork/Mashed Potatoes/Mixed Vegetables and Swiss Steak/Home Fries/Corn
THU –	Roast Beef/Hashed Browns/Green Beans and Spaghetti with Meat Sauce
FRI –	Meat Loaf/Mashed Potatoes/Corn and Veal Parmesan/Potato Puffs/Mixed Vegetables
SAT –	Roast Beef/Hashed Browns/Green Beans and Fried Chicken/Potato Puffs/Mexican Corn
SUN –	Baked Ham/Home Fries/Peas & Carrots and Spaghetti with Meat Sauce

TABLE 1 (cont'd)

SANDWICHES

Hamburger
Cheeseburger
Grilled Cheese
Frankfurter
Pizza
Roast Beef
Ham
Ham & Cheese
Bologna & Cheese
Salami & Cheese
Sliced Turkey

ACCESSORY ITEMS

Salad Dressing Packets
Rolls/Bread and Butter
Gravy Cups
Hard Cooked Eggs
Pickle Packs
Potato Chips
Corn Chips
Crackers

BEVERAGES

Milk
Coffee
Fruit Juices
Carbonated Beverages

DESSERTS

Pie
Cake or Cookies
Ice Cream
Fresh Fruit

TABLE 2

SHORT ORDER/BREAKFAST MENU

MEALS

DAILY	Assorted Cold Cereals
MON	Plain Omelet/Bacon, Sausage or Ham/Hashed Browns
TUE/FRI/SUN	Ham & Cheese Omelet/Hashed Browns/English Muffin
WED	French Toast/Bacon, Sausage, or Ham/Potato Puffs
THU/SAT	Scrambled Eggs/Bacon, Sausage, or Ham/Potato Puffs

SANDWICHES

Hamburger
Cheeseburger
Grilled Cheese
Frankfurter
Pizza
Roast Beef
Ham
Ham & Cheese
Bologna & Cheese
Salami & Cheese
Sliced Turkey

ACCESSORY ITEMS

Rolls/Bread and Butter
Hard Cooked Eggs
Pickle Packs
Potato Chips
Corn Chips

BEVERAGES

Milk
Coffee
Fruit Juices
Carbonated Beverages

DESSERT

Breakfast Pastry
Ice Cream
Fresh Fruit

familiar with the handling, processing and sanitation techniques necessary to prepare food for delayed use. A few equipment modifications were necessary. These included providing a pressure fryer, a grill top range and twin, table mounted, five-gallon tilting steam kettles. Additional manually operated packaging machines and a label printing device were obtained for use during the experiment.

All meals, salads, and hot sandwiches were prepared, portioned and packaged in disposable plastic containers, closed with a clear plastic film heat-sealed along the edges of the container. See Figure 1, which illustrates the packaging technique. The contents of a package were therefore fully visible to a customer.

Once meal preparation and packaging were completed, the items were labelled as to content and date, placed in open wire racks, and hung from the walls in a walk-in freezer for freezing and storage. Cold air from the freezer fans flowed over and around each plate, freezing the food within 3–4 hours. Earlier attempts to utilize an experimental liquid nitrogen freezer in this process were unsuccessful because of difficulties encountered in maintaining the freezer in efficient operating condition, and with obtaining a steady, adequate supply of liquid nitrogen.

The operation was planned to minimize storage times for prepared foods, and yet to take advantage of the economies of quantity production. It was intended that chilled foods would be used within two days; frozen sandwiches and breakfast meals would be manufactured once a week and dinner meals every two weeks. During the experiment, however, it was difficult to adhere to this schedule because of limited refrigeration and uncertainties in product demand levels, so that actual production and storage periods were often much shorter.

Cold sandwiches, pickle packs, hard-boiled eggs and other such items were assembled and wrapped according to standard operating procedures in the Inflight Kitchen. Commercially prepared soups (formulated for vending machines) were used since they could be heated, in the can, to serving temperatures in the display cabinet and held in this condition throughout a meal period. Milk, fruit juices, desserts, and accessory items were procured as individual sized servings and required no further preparation. Coffee and carbonated beverage syrups were issued in bulk to be prepared and dispensed at the flight line facility.

One cook and a food service worker were assigned full time to perform the supporting operations in the Inflight Kitchen. Additional personnel were available on a part-time basis when not required to operate the flight line facility.

The Inflight Kitchen supervisor had responsibility for overall management of the food service facility, including accountability. Standard accounting reports were adapted to

FIGURE 1. Packaging Operations

this operation. Detailed informal records of the number of meals served, net cost of issues and income earned were kept on a daily basis during the experiment so that performance could be continually monitored and evaluated.

FLIGHT LINE FOOD SERVICE FACILITY

A small, unoccupied office building of temporary construction inside a hangar (Building S-13) centrally located in the maintenance area was converted into a food outlet. This structure provided separate spaces for service and dining areas, as well as access to all necessary utilities – electricity, a ceiling-mounted, gas-fired heater, water and drain (where a water fountain had previously been connected). Limited storage areas adjacent to this building were also available. Although the confined space and configuration severely constrained the food service facility design, it was ideally situated with respect to the consumer population to be serviced. A diagram showing the layout of the food service facility is included as Figure 2. Views of the interior are shown in Figure 3.

Entrance and exit were from a parking lot on the flight-line, and through a hallway constructed along two interior walls of the facility. A customer entered the service area, signed-in and obtained a disposable paper-fibre tray at the headcount desk, and selected the food items wanted (self-service) as he passed before the various display units. Coffee was available on a separate counter. The dining area which provided four-man tables and a stand-up counter, could accommodate a total of twenty-four customers at any one time. Additional tables for seating twelve persons were available in the enclosed hallway outside the dining area. Knives, forks and spoons, condiments, etc. were available from another counter in the dining area. Several trash containers were conveniently located where the customer could dispose of the tray, packaging and other items after eating.

The space behind the display units contained two microwave ovens, a 65 ft^3 refrigerator that was excess property, and a small water heater and sink. After the start of the experiment, one microwave oven was moved to the counter behind the headcount desk for easier accessibility and use. All counters were built with enclosed dry storage underneath. The storage area next to the facility was equipped with shelving and floor pallets for dry stores and two excess ice cream cabinets for frozen food storage.

Total costs of construction, modifications and equipment installation were estimated at $10,000 by the Base Civil Engineer's Office, Travis AFB.

A minimum of equipment costing about $7500 was needed. The principal requirements were for three product merchandising units – a heated display case for hot foods; a refrigerated display case for cold sandwiches, milk, juices, etc., with shelves above for fruits, packaged desserts, and other items not needing controlled temperatures; and a unit with an ice cream cabinet, ice and water dispenser and a carbonated beverage dispenser with four heads. The microwave ovens were provided by Natick Laboratories

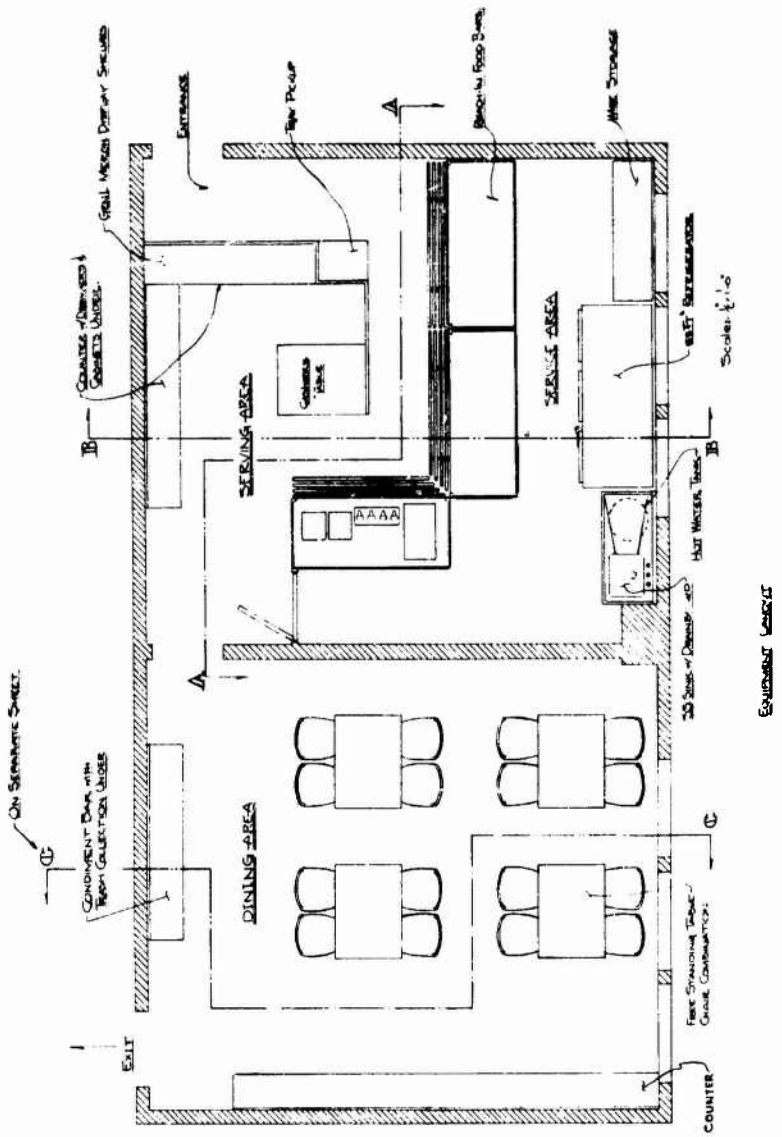

FIGURE 2. Layout of Facility

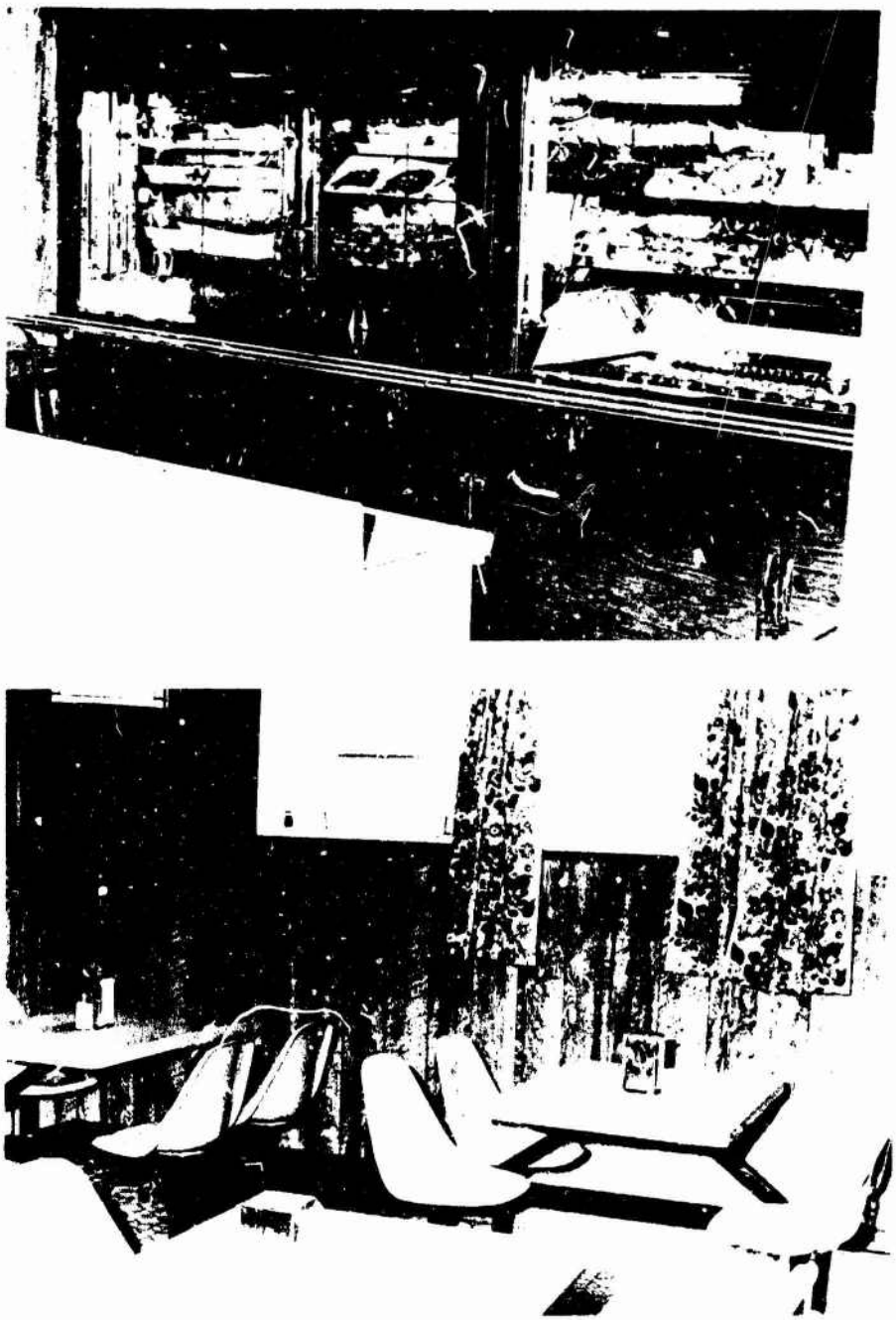

FIGURE 3. Interior Views

and the refrigeration was excess property from the dining hall modification project. The water heater, sink and coffee units were purchased new and installed to completely equip the facility.

As previously indicated, food products were transported each day, in insulated containers, from the Inflight Kitchen in accordance with the expected customer demand. Refrigeration and freezer space in the facility would accommodate at most about a two day supply – the second day of which also provided a buffer in the event that current demand exceeded anticipated needs. Frozen meals and sandwiches were allowed to thaw in the refrigerator before reheating. Dinner meals and sandwiches required about 14-16 hours for tempering, and therefore had to be taken from freezer storage to the refrigerator prior to closing, at 0230, on the morning of the day they are to be used. Similarly, breakfast meals required 8-10 hours for complete thawing, and so had to be loaded in the refrigerator early in the afternoon on the day before the day of use. The meals and sandwiches were taken from the refrigerator and heated in the microwave ovens starting about an hour before meal time, and then placed in the heated display case (maintained at 150-160°F).

Enough food was stocked initially to satisfy the needs of the first hour of operation, and additional food was heated throughout the meal period to continously replace those items served. In instances where thawing was incomplete and/or time did not permit total heating in the microwave oven, the temperatures in the heated cabinet were increased to finish the process.

Soups presented a different problem, since they were in metal cans and could not be heated in the microwave ovens. About five hours before start of operations, while the facility was being supplied with perishables, the heated display case was turned on and loaded with soups, which would then be hot enough for serving during the meal.

The cold food display case was filled just prior to the meal period, and restocked from the refrigerator as necessary. Food items served at room temperature, for example, fruits and packaged desserts, were put on the shelves at the same time, and replenished if needed. Coffee was brewed at the start of a meal, and again whenever required. Sufficient quantities of trays, eating utensils and condiments could be made available to last through the meal period.

The operating hours were from 1630-1900 hours for the dinner meal and between 2300-0230 hours for a combination short order/breakfast meal. Additional duty time was allowed personnel working in this facility for processing foods being served at each meal, sanitation, resupply and rest breaks and meal periods.

A facility supervisor and two food service workers were responsible for supplying the facility from the Inflight Kitchen and food service operations during the first meal

period. Three food service workers were assigned part time to operate the late meal. Only two worked each shift on any given day. Any additional available time was allocated to support operations in the Inflight Kitchen.

PERFORMANCE EVALUATION

a. **Headcount.** Total headcounts in the flight line facility are summarized below for each month of the experimant. This headcount represents 6.5% of all meals served to base personnel. During this time, the facility operated 89 days (it was closed Christmas, New Year's Eve and New Year's Day), serving an average of 202 meals per day in approximately equal proportions between the early and late meal periods. Participation by RIK personnel steadily increased, and was 56% higher at the end of the experiment as compared to the first month of operations. The BAS headcount declined toward the end of the experiment, but still accounted for nearly 40% of the total attendance during the experiment.

Month	RIK	BAS	Total
1-30 November 73	2859	2609	5468
1-31 December 73	3450	2747	6197
1-31 January 74	4459	1832	6291
Total	10768	7188	17956

Of all the meals served in this facility nearly 75% were served to airmen in one of the several maintenance squadrons located in this area. The remainder of the meals were received by personnel assigned to other squadrons operating on the flight line.

Unit	% of Total Meals Served
60 AMSq	7.3
60 FMSq	30.8
60 OMSq	29.6
602 OMSq	4.7
604 OMSq	1.4
60 MAWg	8.0
60 SPSq	7.3
60 SUPSq	4.8
60 APSq	4.5
Other*	1.6

*Each unit less than 1%

b. Food Costs.

Monthly food costs are shown in the following table:

Month	Number of Meals	Earned Income	Net Issues	Cost per Meal
1-30 November 73	5468	$5446.13	$7285.43	$1.332
1-31 December 73	6197	6153.62	7531.79	1.215
1-31 January 74	6291	5504.63	7266.85	1.155

The average cost per meal served was $1.230 as compared to $0.943 per meal allowance. Overall losses, earned income less net issues, amounted to $0.287 per meal. These losses derived from three principle sources:

1. Food preparation involved new processes and formulations for which the Inflight Kitchen had no experience, therefore, food costs were expected to run slightly higher until the necessary procedures and techniques were learned and refined. As is apparent from these data, significant progress was made in this respect – raw food cost per meal reduced by nearly 15% between the first and last month of the experiment.

2. The meal allowance was decreased in January, equivalent to $0.11 per meal, but no adjustments were made to the menu being served which had been designed to the meal allowance of approximately $1.00.

3. Customer self service was permitted in this facility, thus the selection of items and the amount taken were essentially uncontrolled. From an analysis of the costs of the 496 meals included in the nutrition evaluation, more than 25% exceeded $1.00 in raw food costs, ranging up to $1.84.

Each of these problems can easily be corrected and there should be no difficulty in eliminating all such losses in an operational situation. (In fact, in the continued operation of the facility by Travis AFB following the experiment, food costs were subsequently reduced. For the latest period, May 1974, the reported food costs were $0.857 per meal as compared to the meal allowance of $0.860.)

c. Labor Costs.

Estimated labor costs are based on assigned staffing to both the flight line facility and for supporting operations in the Inflight Kitchen. This is equivalent to a total of

$206.27 per day labor costs, or $1.022 per meal. Productivity, or meals per man hour invested is calculated as 5.2, which compares very favorably to the 4.3 meals/man hour for dining hall operations.*

Assigned Personnel	Hours per Week	Wage Rate* (per hour)	Cost per Week
a. Flight-Line Facility			
1. Supervisor (WS-1)	25	$6.62	$165.50
2. Food Service Workers (WG-2)	98	4.98	488.04
b. Inflight Kitchen			
1. Supervisor (WS-1)	15	6.62	99.30
2. Cook (WG-5)	40	5.76	230.40
3. Food Service Workers (WG-2)	85	4.98	423.30
4. Military Supervisor (E-6)	8	4.67	37.36
Total	271	—	$1,443.90

*Includes salaries and benefits.

d. Total Meal Costs.

A factor of 10% of variable costs (i.e., food and labor costs) is used for the cost of utilities, laundry, transportation, trash collection, etc. Then, the total meal costs for the experiment are determined to be:

Cost Component	Cost/Meal
Food	$1.230
Labor	1.022
Other	0.225
Total	$2.477

If food costs were reduced to the present allowable levels, the total meal costs would be substantially the same as the $2.05 for dining hall operations prior to the experiment.* (Using May 1974 food costs, as noted above, the total meal costs would be about $2.07 per meal. Labor costs during this time were essentially unchanged.)

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*Based on estimated average manning levels and actual food costs (i.e., net cost of issues) for June-August 1973, with food costs increased by 2.1% to reflect higher BDFA values.

NUTRITION EVALUATION

The food items selected at a meal were recorded for each of 496 randomly selected persons at 15 different meal periods throughout the experiment. Nutritional values were calculated for each food item using the Armed Forces Recipe service formulations and USDA Handbook #8 Food Composition Data. The nutritional values were summed over all food items comprising an individual meal and then averaged for all meals and compared to the daily dietary allowance. Since seconds and multiple servings could not be accurately counted in the data collection process, these values should be considered as gross estimates of the average values for the meals served in this facility.

Nutritional Components	DDA[1]	Average Meal Values Mean	Standard Deviation	% of DDA
Food Energy	3400 Cal	1392.2	462.3	41
Protein	100 g	70.9	29.0	71
Fat[2]	152 g	73.0	24.8	48
Calcium	800 mg	810.6	279.3	101
Iron	18 mg	8.7	4.2	62
Vitamin A	5000 IU	2652.3	1307.7	53
Thiamine	1.7 mg	0.8	0.4	47
Riboflavin	2.0 mg	1.5	0.5	75
Niacin	22 mg	10.9	5.3	50
Ascorbic Acid	60 mg	50.7	37.6	85

[1]Daily dietary allowance for male personnel as prescribed by AFR No. 160-95, Medical Services Nutritional Standards, 10 August 1972.

[2]Should not exceed 40% of total caloric intake.

Assuming that a meal should provide for approximately one-third of the total daily dietary allowance, it can be concluded from these results that the meals served are generally highly nutritious, except that fat was slightly high. Minor adjustments in the menu should correct this situation.

CONSUMER EVALUATION

Face-to-face interviews were conducted with a random sample of all customers over a 15 day period in November-December, using a structured questionnaire.

Each food item selected for the meal eaten just prior to the interview was rated on a 9-point scale ranging from disliked it extremely to liked it extremely, where the center point was neither liked it nor disliked it. These ratings were then tabulated and summarized by food category.

Food Group	RIK	BAS
a. Entrees (including sauces and gravies)	7.2	7.0
b. Soups	8.3	7.3
c. Salads and dressings	7.3	7.5
d. Potatoes and starches	6.7	7.2
e. Vegetables	6.7	7.1
f. Breads and rolls	7.1	7.6
g. Beverages	8.5	8.5
h. Desserts and fruits	8.3	8.2

The overall rating of the meals was 7.5 for the RIK participants and 7.7 for those personnel on BAS. Comparisons with other meals eaten in the Air Force are shown below.

Rating	BAS	RIK
Much Worse	4%	2%
Little Worse	6	5
About Same	31	42
Little Better	35	20
Much Better	24	31

All of the above ratings indicate a high degree of satisfaction for the food served on the part of the consumer.

Consumer reactions to this new food service facility and operation were obtained in terms of whether they liked, disliked or were indifferent to them. The customers were also asked to contribute open ended comments as to what they liked about the facility and if any changes were desired. The reactions to the facility and operation are summarized as follows:

Response	RIK	BAS
Like	98%	98%
Dislike	0	0
Indifferent	2	2

The more significant comments of those customers who liked the facility were:

Category	% of Comments*
a. Convenience of location	31.0
b. Quality of food	13.0
c. Speed of service	8.2
d. Atmosphere	8.7
e. Availability of hot foods	5.0
f. Decor and cleanliness	5.0

*From a total of 103 comments.

The more important comments relating to changes desired included:

Category	% of Comments*
No changes desired	20.4
Provide music	16.5
Larger dining area	13.6
Extend operating hours	13.6
Offer greater variety	10.7

*From a total of 103 comments.

No one indicated disliking the facility or service, and only two persons expressed indifference.

It is clear from these data that the customers liked the facility, particularly the convenient location near to their work and the quality of the food, and to a lesser extent, the service and atmosphere. Further, a substantial proportion of the respondents wanted no change in the facility design. The changes desired included only minor alterations to the menu, which was not feasible during the experiment because of the space constraints, and extending the service hours, which was prevented by manpower limitations.

CONCLUSIONS AND RECOMMENDATIONS

A number of advantages are provided by this concept and operation. In addition to offering the customer better service and higher quality foods than is possible when serving box meals, it is significant that considerable savings in man-hours were reported by the squadrons in the maintenance area because of the convenience of the food outlet.

Although the desired level of cost was not achieved during the experiment, it is apparent that this facility can be operated at least as effectively as the dining halls, without higher food costs, and with increased labor productivity. Considering all this, as well as the high level of participation and acceptance expressed by the consumer, it is recommended that the Air Force adopt this concept for application at all installations where requirements for satellite feeding of this type exist. The decision as to whether to perform the food preparation and support from an existing dining hall or Inflight Kitchen should be based on local considerations.